

HITEKS

TELEMETRY AND ENERGY



INSTRUCTION MANUAL DPF Series

MAN_000014_eng_(DPF)_ED.3.0_gen_2025

(Valid Release Manual: 3.0)



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1. OVERVIEW

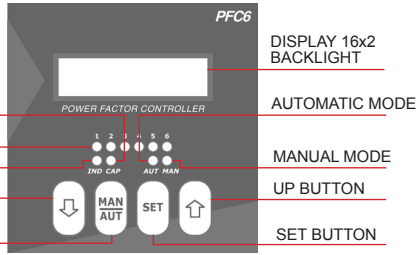
Please read this handbook carefully: it provides important information about safety, usage and maintenance of our product.

The DPF electronic regulator allows the control of the power factor ($\cos\phi$) on electric networks by measuring all the electrical values such as Voltage, Current, THDI(%), etc...

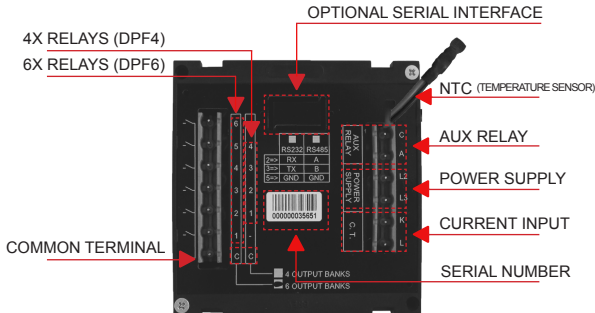
Using accurate diagnosis software, the regulator measures only the fundamental values by removing the harmonics components. A large LCD display allows all the data to be easily read. Regulator operation is indicated by the LEDs on the front panel. All the user operations can be performed using the four button keypad.

DPF6 - Model 6 banks

Front

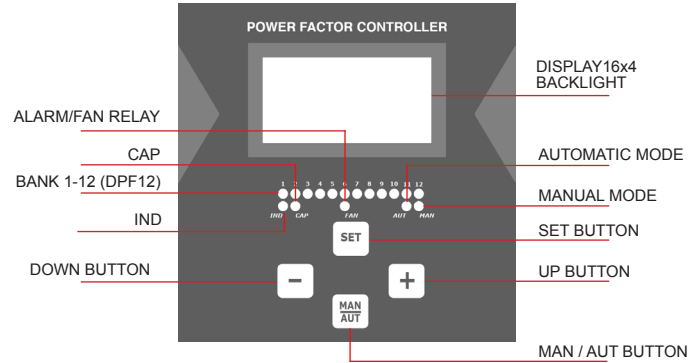


Back

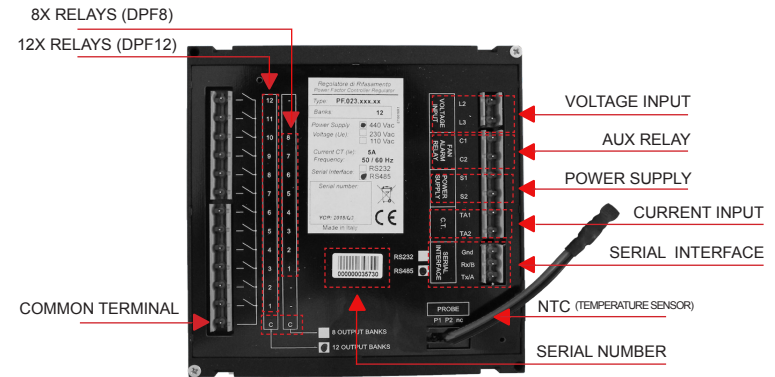


DPF12T - Model 12 banks

Front



Back



2. INSTALLATION

Install the regulator in according to the wiring diagram section 6 and in according to the electric specification of this manual.

3. NAVIGATION

Depending on the model installed (see the table pag.5), pressing the SET button on different pages it is possible to navigate into the menù.

Note: the device returns to the MAIN page view if not done any pressure after 30 seconds.

To reset the recordings of the maximum values measured press the UP button and confirm the reset button DOWN. After 30 seconds of viewing the selected parameter, the controller back to viewing the main page.

To insert or disconnect the banks you need to setup the device to the manual mode, stay on page 1, press the UP or DOWN to select the banks, and then press the SET button to confirm.
For each bank it is possible verify the value setup and also is available the hystorical total number of operations, so it is possible the contact wear estimation.(this data is not resettable as it shows the wear of the system).

The manual insertion of banks involves the disconnection of the automatic adjustment feature, but still allows control of all other measures and alarms.

Where a interruption occurs in the supply voltage. banks status in manual is stored in not volatile memory; this operation allows the regulator to insert the same banks as soon as power is restored.

To switch from automatic to manual and back, you must press the MAN / AUT 5 sec from the main screen and consequently the activation of the corresponding LED.

Note: If the POWER FACTOR measure is unstable, reverse the terminals to amperometric contact KL.

In automatic mode all adjustments are made in complete harmony of the parameters by inserting and / or disconnecting the banks power factor likely to reach the setup Cosφ.

4. NAVIGATION PAGES

Model 4 or 6 banks

Pag	Menù	View
1 MAIN	Power Factor	Power Factor
	VOLTAGE	Voltage RMS
2	CURRENT	Current RMS
	Delta Power	Reactive power in excess and / or in deficit compared to the set value
3	THD 1%	Current harmonic distortion percentage
	Week cosφ	Average weekly power factor
4	Ifo	Fundamental current
	Iharm	Harmonic current
5	SET COSφ	Setting the value of power factor adjustment in automatic mode (this parameter is modified only in manual)
	THD 1% MAX	Maximum peak value current harmonic distortion
6	Vrms MAX	Maximum value reached voltage Vrms
	Irms MAX	Maximum value reached current Irms
7	TEMP	Instantaneous temperature
	T MAX	Value of maximum temperature reached
8	T. START FAN	Starting temperature threshold ventilation (FAN dedicated to drive the relay when set with this feature)

Model 8 or 12 banks

Pag	Menù	View
1 MAIN	Power Factor	Power Factor
	VOLTAGE	Voltage RMS
	CURRENT	Current RMS
	Delta Power	Reactive power in excess and / or in deficit compared to the set value
2	THD 1%	Current harmonic distortion percentage
	Week cosφ	Average weekly power factor
	Ifo	Fundamental current
	Iharm	Harmonic current
3	TEMP	Instantaneous temperature
	T. START FAN	Starting temperature threshold ventilation (FAN dedicated to drive the relay when set with this feature)
4	SET COSφ	Setting the value of power factor adjustment in automatic mode (this parameter is modified only in manual)
	P	Active power
5	Q	Reactive power
	A	Appear power
	THD 1% MAX	Maximum peak value current harmonic distortion
6	Vrms MAX	Maximum value reached voltage Vrms
	Irms MAX	Maximum value reached current Irms
	T.MAX	Value of maximum temperature reached
	P MAX	Active Power reached maximum
7	Q MAX	Reactive Power reached maximum
	A MAX	AppearPower reached maximum

4.1 Alarm list

HIGH VOLTAGE	Voltage measured > 110% Un >15 min. Alarm relay ON and banks disconnection.
LOW VOLTAGE	Voltage measured < 85%Un > 15 min. Alarm relay ON. The voltage supply is less than 85%Un.
HIGH CURRENT	Current measured from the C.T. > 110% In >2 min.
LOW CURRENT	Current measured from the C.T. < 5% In >5sec.; if this conditions during more than 2 min the banks will be power OFF.
UNDER COMPENS	Equipment does not reach the target $\cos\phi > 15\text{min}$. Alarm relay ON.
OVER COMPENS	Power Factor measure >1.00 (capacitive) > 2 min. Alarm relay ON and banks disconnection.
HIGH THD%	Total Harmonic Distortion measure > THERM THD%. Alarm relay ON and banks disconnection.
OVER THD%	Total Harmonic Distortion measure > OVER THD%. Alarm relay ON and banks disconnection.
OVER TEMPERATURE	Internal Equipment temperature > OVER TEMP. Alarm relay ON and banks disconnection.
MAIN FAILURE	Voltage missing or below the minimum value of the equipment. Alarm relay ON and banks disconnection.

The normal functions resume when the alarm condition ends and the alarm relay is reset. In this way, the system automatically uses the banks available neglecting the banks set FIX. For use by the banks in FIX mode you must set this mode in the setup of the banks. In order to achieve maximum performance of the plant regulator shall calculate the exact time of zero crossing of the voltage to insert / unplug the exact capacitor banks in the absence of tension, and in this way you avoid the dangerous arcs due to load capacitance shunting the line.

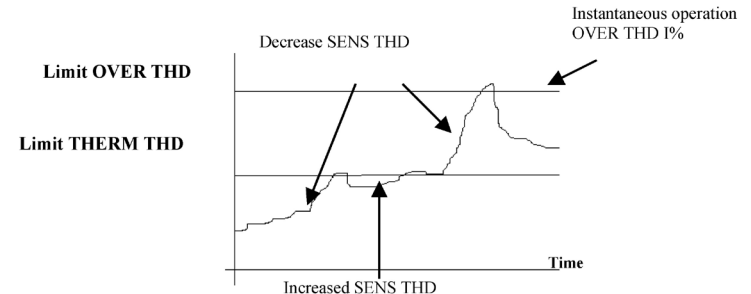
4.2 Fix mode setup features

Setting the banks in the FIX mode uses the same device to adjust to. In this mode the banks can be activated to enable a function of fixed phase plug and the device ignores it using the other for compensation.

To insert or disconnect the banks FIX is set to repeat the same steps for the activation of a banks in the manual and then go to. In this way, the system automatically uses the banks available neglecting the banks set FIX. For use by the banks in FIX mode you must set this mode in the setup of the banks. In automatic operation is therefore adjust with any banks, in case of alarm that affect the capacitors, the device turns off even the banks in the same mode set as FIX safeguarding its integrity, then reconnect it to stop the alarm.

4.3 THD I% protection features

The internal algorithm of the instrument continuously monitors the progress of harmonic current distortion at the point of installation of the current transformer. If the instantaneous THD is greater than the threshold set-THERM, the system gradually decreases the value of SENS with step 1 second up to a full logic 0 where the release occurs in a sequence of banks inserted. The new entry will occur only if the conditions of THD is brought below the threshold set THERM. In the instant case the THD is oscillating close to the threshold setting THERM, the device performs a decrement for the duration of time greater than the threshold THD instant, and an increase up to a maximum of setting the initial direction, in case THD is reported following the flash below the threshold of control. This algorithm allows to simulate a warming of the capacitor due to harmonics thus a disconnection of the banks in case of continuation of the situation, avoiding dangerous clocks and protecting the capacitors. If you still want your device to re-insert the banks immediately when the instantaneous THD falls below the threshold you must set the parameter to ON DOWN SENS.



5. PARAMETERS DESCRIPTION

The parameters can be set by PAR SETUP, MAIN SETUP, SERIAL SETUP.

5.1 Par Setup

To access the basic ("PAR SETUP") menu:

- Set the regulator on MANUAL mode by pressing the MAN/AUT button and disconnect all the banks.
- Press and hold the SET button until PAR SETUP access.

To navigate between the setting parameters press the SET button; press DOWN or UP button to modify each parameter.

Parameter	Description
PAR TA	Current Transformer ratio (i.e. 10.000/5)
SENS	Tolerance sensibility to the cosφ regulation
OVER TEMP	Maximum operating temperature (°C)
THERM THD I%	THD(I)% alarm value (see also the SENS THD I% parameter)
OVER THD I%	Instantaneous THD(I)% peak alarm value
SENS THD I%	THD(I)% alarm value time (sec.)
SENS DOWN	Alarm reset time delay : *if set to ON, resume instantaneously the normal operations when the alarm ends; *if set to OFF, resume the normal operations with a delay time equals to the SENS THD I% value;

NOTE: The adjustment of the sensitivity (Sens) is done by setting the respective value of intervention, consistent with the timing of reconnection (RC time), then it follows that the smaller the set value the faster the adjustment of power factor.

Setting the parameter THERM THD I% is related to the technical technical features of the capacitor sull'impianto installed, then check the manufacturer's data for the limit of endurance of the capacitor current harmonic content (i.e. 50% for 60 sec)

To modify these parameters, press and hold the SET button and change using the UP or DOWN button.

5.2 Main Setup

To enter in the MAIN SETUP:

- Set the regulator on MANUAL mode by pressing the MAN/AUT button and disconnect all the banks.
- Press and hold the SET button until PAR SETUP access.
- Release and press and hold the SET button until MAIN SETUP access.

To navigate between the setting parameters press the SET button; press DOWN or UP button to modify each parameter.

Parameter	Description
POWER CAP n°	Reactive power ratio (kvar) of each bank; to set a bank in FIX mode (always connected) set the power to "0,0" and press DOWN to read "FIX" on the display
CAP VOLTAGE	Voltage ratio (V) of the capacitors banks
CAP RC TIME	Switch delay time (sec.) (CAUTION) Contact the capacitors manufacturer before modify this value
ALARM RELAY	Type of output contact relay (NC, NO or FAN mode) in alarm condition
EXTERNAL TV	Set the Voltage Transformer (primary and secondary value) if used
LINE FREQ	Network rating frequency (50 or 60Hz)
LINE TYPE	Network system (single or 3-phase)
SYSTEM MODE	Mesurement on 2 or 4 quadrants

Enabling functionality EXTERNAL TV device allows the insertion of a voltage transformer input circuit reading voltmeter. To do this it is necessary to insert the value of the ratio of reduction (RATIO TV). I.e. if the TV is characterized by a ratio of 200:1 parameter RATIO TV should apply 200. The display then the voltage is related to the setting of the parameter, therefore, an incorrect setting will cause an incorrect display.

NOTE: the default device is set up for direct reading, without TV.

Where the reading of the voltmeter occurs upstream of a medium voltage transformer (via a TV as described above) but the inclusion of capacitor banks power factor correction is carried downstream, it becomes necessary to set the ratio of medium voltage through the parameter RATIO MT.

This way you can insert the values of the banks arising directly from the network where the capacitors are installed and maintained.

NOTE: the default device is set for reading side insertion banks.

5.3 Serial Setup

This menu permits to set up the parameters of the serial interface like the address, the baud rate and the parity.

- Set the regulator on MANUAL mode by pressing the MAN/AUT button and disconnect all the banks
- Press and hold the SET button until PAR SETUP access
- Release and press and hold the SET button until MAIN SETUP access
- Release and press and hold the SET button until SERIAL SETUP access

To navigate between the setting parameters press the SET button; press DOWN or UP button to modify each parameter.

Parameter	Description
SERIAL PRESENCE	0 = not enabled, 1= enabled
SET ID	Set the modbus address of the device
SET BAUD	Set the baud rate and the parity bit
DEFAULT	9600 8-N-1

6. ALARM MEM

The not volatile memory device keeps a counter of the alarms received in its operation. ALARM MEM menu is available all the alarm events.

To enter in the ALARM MEM:

- set the regulator on MANUAL or AUTO mode (you should read the PFC on the display);
- press and hold again SET with MAN/AUT until "ALARM MEM" is displayed

Press SET to scroll all the memory or press UP or DOWN to reset the counter.

7. TECHNICAL FEATURE

Power Supply input	
Operating rated voltage	110Vac -20% +10% 230Vac -20% +10% 440Vac -20% +10%
Frequency	50 / 60Hz
Power consumption	3VA (DPF4 - DPF6) 5VA (DPF8 - DPF12)
Recommended fuse	0.5A
Voltage input (only DPF8 - DPF12)	
Measuring range	110Vac -20% +10% (DPF4 - DPF6) 230Vac -20% +10% (DPF4 - DPF6) 440Vac -20% +10% (DPF4 - DPF6) 85 → 525Vac (DPF8 - DPF12)
Frequency range	50 or 60Hz ±5%
Accuracy	5%
Current input	
Maximum rated current	6.0A
Operating current range	0.25 - 5.0A
Accuracy	±5% (0.25 → 5.0A)
Input type	Shunt for external C.T.
Power consumption	< 1VA
Optional	/1A (1,25A max, 0,05 → 1,0A operative current range) (DPF8 - DPF12)
Temperature measure	
Operating Temperature range	0 → +100°C
Accuracy	±1°C
Sensor type	NTC 10k
Relay output	
Relays	5 DPF4 7 DPF6 9 DPF8 13 DPF12
Features	4 +1 banks DPF4 6 +1 banks DPF6 8 banks DPF8 12 banks DPF12 1 alarm / fan * * DPF4-DPF6 bank optional setup

Maximum switching voltage	440Vac - 1A (AC15)
Maximum rated current	250Vac - 5A(AC1)
Maximum current on common terminal	10A
Maximum power	1250VA
Electrical Life	1*10 ⁵ ops
Mechanical working life	2*10 ⁷ ops

Connection	
Type	Plug in – removable
Conductor cross section	0.5mm → 2.0mm

User interface	
Display	16 characters - 2row (DPF4 - DPF6) 16 characters - 4row (DPF8 - DPF12)
Backlight color	yellow
Keypad	4 keys

Serial interface		
Type	RS485 (optional)* (DPF4 - DPF6) RS485 (default) (DPF8 - DPF12)	ANSI/TIA/EIA-485-A-1998
Protocol	Modbus-RTU	

*see the option for serial/ethernet interface

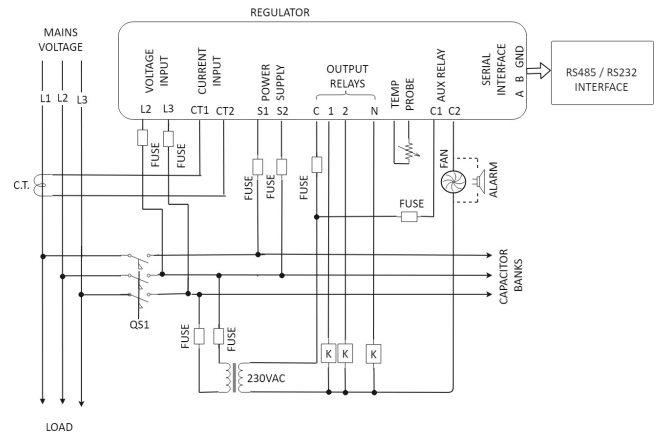
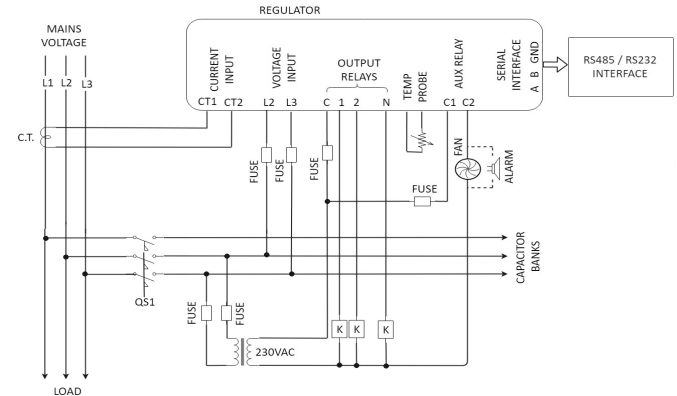
Environment operating condition	
Operating temperature	-20 → +55°C
Storage temperature	-30 → +60°C
Relative humidity (non-condensing)	< 80%

Mechanical characteristics	
Dimensions	96*96*57mm (DPF4 - DPF6) 144*144*57mm (DPF8 - DPF12)
Panel Cutout	92*92mm (DPF4 - DPF6) 138*138mm (DPF8 - DPF12)
Weight	420g (DPF4 - DPF6) 880g (DPF8 - DPF12)
Enclosure	Self-extinguishing V0 plastic
Mounting type	Panel Flush mount
Protection degree	IP41 front (IP54 with optional cover) IP20 rear

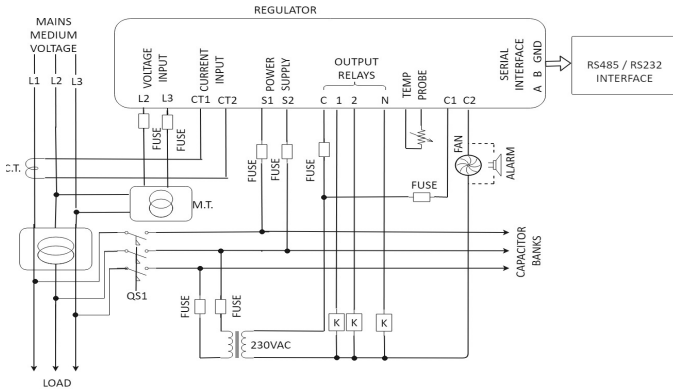
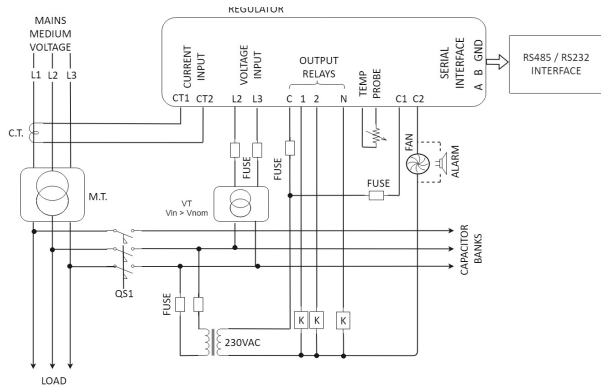
The plant to be protected and monitored must be properly sized based on the harmonic content on the network taking into account the resonance series that can trigger the inclusion of capacitive loads on the line. Then, verify the technical characteristics of capacitors and harmonic filters according to the local network.

8. WIRING DIAGRAM

8.1 Low voltage connection



8.2 Medium voltage connection



Compliance to:

2014/35/EU (Low Voltage)
 2014/30/EU (Electromagnetic compatibility)
 2011/65/CE (RoHS directive)
 2015/863/CE
 2017/2102/CE
 2012/19/CE (RAEE directive)

Reference standards:

EN 61010-1:2010+A1:2019
 EN 61326-1:2013
 EN 61000-6-2:2019
 EN 61000-6-3:2007+A1:2011



Guarantee

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Registered office: via Malerbe, 3 - 36040 Grumolo delle Abbadesse (VI) - Italy
www.shitek.it - info@shitek.it